Property Values in Inner-City Neighborhoods: The Effects of Homeownership, Housing Investment, and Economic Development

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Abstract

This article examines the determinants of property values in Cleveland with a focus on three approaches to improving or maintaining neighborhood quality: investing in new housing, attracting and retaining homeowners, and encouraging economic development. Data comprise home sales in 1996 and 1997, investments in new housing from 1991 to 1995, homeowner migration between 1991 and 1995, and changes in the number of business establishments from 1991 to 1995.

The results suggest that (1) investments in new houses have a positive impact on housing values, especially for houses close to the new investment; (2) homeowner outmigration has a negative effect; and (3) growth in the number of business establishments, except for social service establishments, also has a negative effect. These results further suggest that while programs to encourage housing investment and homeownership can increase neighborhood property values, care should be taken to avoid an inappropriate mixing of land uses.

Keywords: Cities; Homeownership; Urban policy

Introduction

High-quality urban neighborhoods are a common goal of planners, policy makers, real estate professionals, and local residents. Though neighborhood quality is difficult to define, neighborhoods described as "high quality" typically exhibit high or stable property values, low rates of outmigration, high household incomes, racial cohesion, and high-quality public services (Can 1990; Greenberg 1999; Kain and Quigley 1970). Ways to maintain neighborhood quality or facilitate neighborhood revitalization have been the topic of considerable policy discussion in recent years (Greenberg 1999; Hoek-Smit, Linneman, and Megbolugbe 1996; Temkin and Rohe 1996). New Urbanists, for example, prescribe high-density, mixed use, and transportation-oriented development as a means of enhancing physical design (Katz 1994). Housing advocates favor strategies that promote homeownership, infill, and housing rehabilitation (DiPetta et al. 2001). Others, meanwhile, focus on entrepreneurship, industrial recruitment, and growth in employment (Gittell and

Thompson 1999; National Council for Urban Economic Development 1994; Ranny and Bentacur 1992). The success of each of these strategies, however, has been mixed.

In this article, we explore the potential of alternative strategies to enhance the quality of inner-city neighborhoods by focusing on property values as an indicator of neighborhood quality. Our intent is to capture in a simple econometric exercise the effects on residential property values of homeowner migration, investments in housing, and growth in the number of business establishments. We proceed by estimating a hedonic price function with data from Cleveland. Using a geographic information system (GIS), we integrate various spatial and spatially lagged variables and examine interactions between neighborhood variables and housing prices. We find that neighborhood property values are affected by homeowner migration, are enhanced by investments in new housing, and can be damaged by growth in the number of business establishments.

Neighborhood quality

Neighborhood quality has the potential to shape the present and future well-being of families and individuals in a variety of ways. In his classic work, Wilson (1987) argues that the fortunes of the underclass are strongly shaped by the neighborhoods in which they reside. Galster and Hill (1992) draw similar conclusions about neighborhoods, with a focus on race. Following an extensive review of studies, Ellen and Turner (1997) conclude that neighborhoods can influence a variety of individual characteristics, such as educational attainment, criminal involvement, teen sexual activity, and employment, although adults are affected less than adolescents. Further, they caution that while "the empirical record generally confirms that neighborhood matters, it offers virtually no guidance for policy—about how to help families choose healthy neighborhoods, how to improve existing neighborhoods to better support families and children, or how to help residents of distressed neighborhoods avoid or overcome the problems that surround them" (Ellen and Turner 1997, 859).

In part for the reasons described above, questions about why neighborhoods vary in quality, both within urban areas and over time, is of considerable concern to urban scholars and policy makers. Hypotheses that attempt to explain why neighborhood qualities differ and change reflect the theoretical foundations on which they are based. Ecological models stem from the work of urban sociologists and economists and focus on exogenous forces that shape the dynamics of neighborhood change.

Such forces include ecological forces, akin to biological ones, that cause invasion and succession or a life cycle of neighborhood change; filtering processes that cause neighborhood quality to change systematically with age; and economic factors that shape the bid-rent functions for urban land. Subcultural models are less deterministic and focus on such factors as social networks, socially determined neighborhood reputations, and sense of neighborhood attachment. In these models, resident migration patterns, or the lack thereof, are critical indicators of neighborhood change. Finally, political economy models focus on the forces of capital accumulation and the institutions through which this accumulation takes place. In these models, the type and location of capital investments are critical factors in neighborhood change.

On the basis of their review of these theories, Temkin and Rohe (1996) offer a complex model that includes national, metropolitan, and local determinants of neighborhood change. Most important for our research, they provide a framework in which physical, social, and economic factors can all have a significant impact on neighborhood quality. In their framework, investments in housing construction, homeowner migration, and investments in new establishments can all potentially serve as policy instruments for enhancing neighborhood quality.

Housing prices as a measure of neighborhood quality

Housing prices are imperfect measures of quality. They are influenced by many factors, including proximity to jobs and commercial establishments, access to environmental amenities, taxes and public services, and the income level of neighborhood residents.[1] Certainly there are many lower-income neighborhoods with relatively low housing values that have a number of redeeming qualities. Still, economic theory suggests that holding other things constant, high-quality neighborhoods will have high-bid rents. Thus, housing prices and neighborhood quality tend to be closely correlated. Further, many studies have found neighborhood quality capitalized in housing prices (Goodman 1978; Knaap 1998; Li and Brown 1980).

Because of this strong correlation, housing prices have frequently been used as a measure of neighborhood quality. Kain and Quigley (1970) argue that changes in property values provide a lower-bound estimate of the benefits of urban renewal. Brueckner (1983) suggests that property values provide a measure of public sector efficiency, while Galster

[1] The literature on the determinants of housing prices is too extensive to review here. See DiPasquale and Wheaton (1996) for a conceptual treatment and Knaap (1998) for a review of empirical research.

(1987) claims that they can be used to estimate the benefits of housing rehabilitation, and Can (1990) uses housing prices to measure neighborhood dynamics. In this article, we examine the question of whether three neighborhood development strategies affect housing values. We do not argue that housing prices represent a perfect index of neighborhood quality or policy success. Rather, we claim only that housing prices are correlated with neighborhood quality and can be used to identify the impact of strategies for neighborhood stabilization and redevelopment.

Neighborhood revitalization strategies and housing prices

Neighborhood revitalization strategies come in many forms. We will focus on three: homeownership, housing investment, and economic development.

Homeownership has been a long-standing goal of many federal housing programs and a common focus of neighborhood revitalization efforts. In reviewing studies that examine the broad social impact of homeownership, Rohe, Van Zandt, and McCarthy (2001) find strong evidence that homeownership results in greater satisfaction in homes and neighborhoods, more participation in voluntary and political activities, and less of a tendency to move. They find weaker evidence that homeownership leads to increased self-esteem, less antisocial behavior, or improved physical health. In reviewing theoretical and empirical research on homeownership and neighborhoods, Haurin, Dietz, and Weinberg (2002) find many compelling social science theories that homeownership could have favorable spillover effects on neighborhoods but little empirical evidence that it does. Rohe and Stewart (1996), however, did find evidence of a positive influence. Through increases in property maintenance and longer tenure, they argue, modest changes in homeownership can lead to higher property values and greater neighborhood stability. Coulson, Hwang, and Imai (2001) found favorable impacts and additional benefits when homeowners are clustered. Lee, Culhane, and Wachter (1999) and Ellen et al. (2001) also found positive effects on housing prices, while DiPasquale and Glaeser (1999) found none.

Investment in new housing and housing rehabilitation has been another long-standing neighborhood revitalization strategy used by governments and nonprofit organizations. So common is this approach that Van Ryzin and Genn (1999) term the foundation on which it is based the neighborhood revitalization hypothesis: “the idea that government housing programs, especially working in partnership with

community-based nonprofit organizations, constitute a critical ingredient in the physical and economic rejuvenization of poor urban neighborhoods" (Van Ryzin, Gregg, and Genn 1999, 807). Major federal housing programs include public housing, certificates, and vouchers; other U.S. Department of Housing and Urban Development (HUD)-assisted housing programs; rural housing programs; and low-income housing tax credit programs.[2] While the goals of these programs have been the topic of some debate, the dual goals of decent housing and suitable neighborhoods set forth in the 1949 Housing Act are commonly cited (Newman and Schnare 1997). Community Development Corporations (CDCs) engage in a variety of activities, such as business development, community lending and organizing, lobbying, and social services, in pursuit of community development. But perhaps the most common measure of the success of CDCs is the number of housing units they have helped construct or rehabilitate (Cowan, Rohe, and Baku 1999).

The effects of government and CDC housing programs on neighborhood quality, however, remain uncertain. Using data on home sales in New York to examine the impact of two homeownership programs, Ellen et al. (2000) find prices successively lower in rings surrounding program sites. Critics of such an approach include Newman and Schnare (1992, 1997), who argue that large-scale government production programs can lead to racial segregation, isolation, and concentration of the urban poor. On the basis of a national assessment of the impact of a variety of assisted housing programs on neighborhood quality, they conclude that "project-based assistance programs do little to improve the quality of recipients' neighborhoods relative to those of welfare households and, in the case of public housing, appear to make things significantly worse" (Newman and Schnare 1997, 703).

Economic development as a neighborhood revitalization strategy also has a long history and a new design-oriented twist. Generating jobs and facilitating business development are the principal goals of many economic and community development organizations and agencies. Creating jobs and business is typically the primary objective of policies such as enterprise zones, tax increment finance districts, worker training programs, business loans, and tax incentives (Blakely 1989). This holds true even in distressed inner-city neighborhoods (Porter 1997). Bartik (1991), in an extensive review of studies, finds evidence that such strategies can succeed in creating jobs and that this success is capitalized into housing prices.

[2] See Newman and Schnare (1997) for more detail.

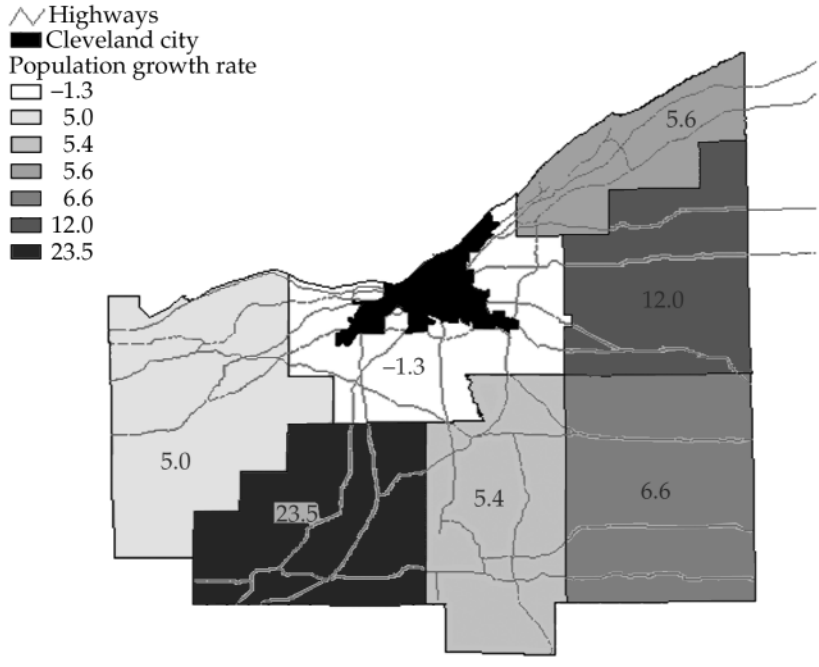
Recently, new interest has developed in mixing commercial and residential uses as a neighborhood development strategy. Under the label of smart growth (Burchell, Listokin, and Galley 2000) or New Urbanism (Bohl 2000; Katz 1994), Ewing and Hodder (n.d.) and others claim that mixing land uses can strengthen communities by creating more pedestrian-friendly environments, facilitating more interpersonal interaction, and increasing property values. Eppli and Tu (1999) provide evidence that such New Urbanist neighborhoods exhibit price premiums over traditional suburban neighborhoods. Song and Knaap (2002) show that such premiums reflect both improved elements of urban design and greater access to nonresidential land uses. Further, a 1999 HUD report demonstrated that despite their significant buying power, many inner-city neighborhoods were significantly "underretailed," leaving residents no choice but to shop outside their neighborhoods. These studies suggest that neighborhood development strategies require a mix of residential and nonresidential development programs.

Research context

To explore the effects of neighborhood development strategies, we focused our research on the Cleveland metropolitan area. Like many other central cities in the Midwest, Cleveland continues to lose population to the suburbs. According to the 2000 census, the Cleveland metropolitan area grew by approximately 3 percent over the previous decade, while the population of Cleveland proper continued to decline, falling below 500,000 for the first time in 100 years. At the same time, the surrounding counties all saw their population increase. Medina County had the most impressive growth, up 23.5 percent from 1990. (See figure 1.) The expected impact on Cleveland's housing market is substantial. According to a report prepared by Cleveland State University ("Housing Supply and Demand" 1988), an estimated 103,800 housing units were expected to be built in Cleveland's suburbs and 17,500 in Cleveland proper from 1987 to 2005. After adjusting for population migration from the city to the suburbs, the report suggested that a surplus of 94,200 housing units would remain in Cleveland. This surplus, the report warned, would lead to substantial decreases in housing prices, higher vacancy rates, and wide-scale abandonment. Not all of these predictions have proven accurate, but given the great potential for inner-city abandonment, the Cleveland metropolitan area provides an ideal setting in which to examine the factors that influence residential property values in a declining industrial city and to gain insight into how to facilitate neighborhood stability and arrest neighborhood decline.[3]

[3] For more on metropolitan housing dynamics in Cleveland and elsewhere, see Bier (2001).

Figure 1. **Population Growth in the Cleveland Metropolitan Area, 1990 to 2000**



New housing construction to reverse the depopulation of inner-city neighborhoods is a top priority among Cleveland policy makers. In 1994, the city received approximately $34 million from the federal Community Development Block Grant program; about half of this money was devoted to housing through the city's Department of Community Development. HUD also manages the federal HOME program, which provided another $7 million in housing subsidies in 1994. Additional sources for new housing in Cleveland include the Housing Trust Fund, the Ward Allocation Grants, the Land Bank Program, and Neighborhood Bond Funds (Simons and Sharkey 1997). With these and other programs, Mayor Michael White proposed to increase housing starts in the city from approximately 50 units per year to 2,000 units per year (Simons and Sharkey 1997). Program moneys were used to heavily subsidize new housing projects in the city. The amount of the subsidy was required to be deducted from the selling price, making these houses cost less than market value.

Also, CDCs are numerous and active in Cleveland and are strongly supported by local foundations and other nonprofit organizations. Annual resources available for community development exceed $35 million. Moreover, city officials strongly encourage CDC activity in housing

development. Nearly every major housing project built recently in the city has had major CDC involvement (Ding, Simons, and Baku 2000).

Data description and transformation

To conduct our analysis, we collected data on the characteristics and prices of properties sold in 1996 and 1997 and on the characteristics of the neighborhoods in which they were located. The Cuyahoga County Auditor and Amerestate database provided detailed information on housing structure, such as condition, style, age, and price; transaction date; and many other factors. We chose single-family houses with arm-length transactions. The definition of neighborhood is, of course, dicey. As Megbolugbe, Hoek-Smit, and Linneman (1996) point out, different neighborhood definitions serve different research purposes. Among the many characteristics that define neighborhood, they offer the following:

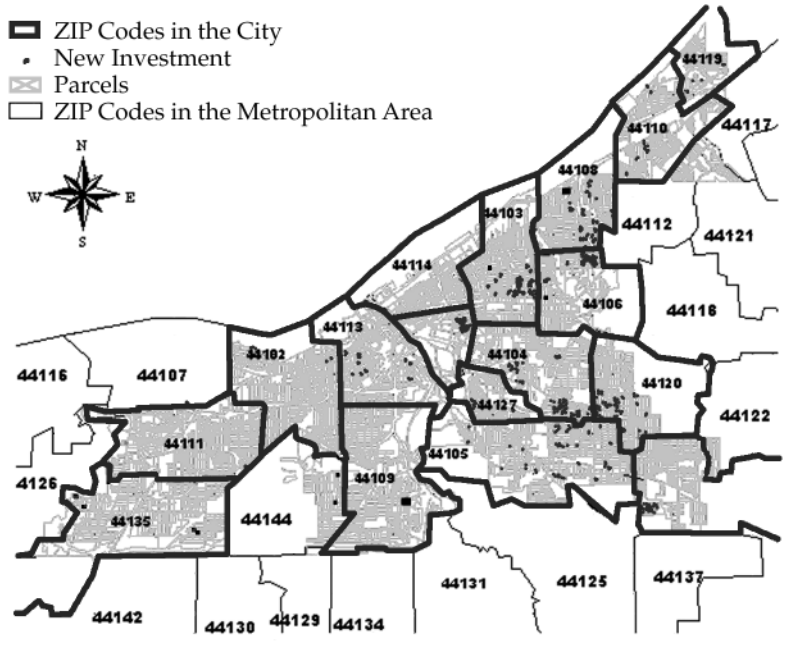
1. Homogenous areas sharing demographic or housing characteristics;
2. Areas that may have diverse characteristics, but whose residents share some cohesive sense of identity or political or social organization;
3. Housing submarkets in which homes are considered close substitutes; or
4. Small areal units that do not necessarily have any of the above characteristics.

Like other empirical attempts to analyze neighborhood dynamics, our definition is largely data driven and matches none of these definitions perfectly.[4] Our establishment, employment, and migration data are available only at the ZIP code level, so we can examine the influence of these variables only at this scale. Our data on housing investment, however, include street addresses and allow us to explore the effects of housing investments at various levels of spatial resolution. Whether neighborhoods are best defined by ZIP codes or some other areal unit is unclear, but not critically important here. What *is* critical is recognizing that the influence of neighborhood characteristics can differ at different levels of resolution and that interpretations and conclusions reflect the resolution at which data are analyzed. We will return to these issues later.

[4] Empirical analyses of neighborhoods and housing submarkets include Straszheim (1975) and Goodman (1981), who use political jurisdictions in a metropolitan area; Bingham and Zhang (1997) and Schwartz (1999), who use ZIP-code areas; Simons, Quercia, and Maric (1998), Chen (1994), and Rothenberg et al. (1991), who use census tracts; Can (1990), who uses census blocks; and Kain and Quigley (1970), who use the vicinity around individual properties.

We obtained data on neighborhood change from three sources. From the city of Cleveland's Department of Community Development, we obtained information such as the location, date, and amount of investment in new housing. We included residential investments from 1991 to 1995 but excluded investments in 1996 because construction might not have been finished before our 1997 sales observations. In total, there were 533 new housing units built with government or CDC support. Since new subsidized housing units are usually built in economically depressed neighborhoods and are typically more expensive than surrounding units, we expect that these new houses will have a positive impact on existing properties.[5] The mean value of these new residential units was $82,071, with a median value of $67,500. A map showing the location of investments in new housing is presented in figure 2. Most took place in the eastern part of the city. No new housing investment took place in the ZIP code that contains the central business district (CBD), that is, 44114.

Figure 2. **Subsidized Investments in New Housing in the City of Cleveland by ZIP Code, 1991 to 1995**



[5] This, however, is not a foregone conclusion. Investments in new housing exacerbate the problem of excess supply and thus could place downward pressure on the value of surrounding homes.

We derived measures of homeowner migration from data on deed transfers. The Ohio Housing Research Network processes and generates records of single-family home and condominium deed transfers for the Cleveland metropolitan area. Each deed transfer record contains the name of the seller, the name of the buyer, the date of the deed recording, and the ZIP code. The names of sellers and buyers within the metropolitan area were matched. This process generated a seller-buyer matrix aggregated by ZIP code. The entry in each cell (i,j) represents the number of homeowners that owned a home in ZIP code i and purchased a home in ZIP code j. The sum of a column in the matrix represents the total number of homeowners moving into a ZIP code, while the sum of a row presents the total homeowners moving out of a ZIP code. Hence, the table is similar to an origin-destination matrix or any other single-period transition matrix.[6]

It is important to note that the matrix contains information only on people who bought and sold a home in the metropolitan area between 1991 and 1995; hence, there is nothing on renters, first-time homeowners, or homeowners who moved into or out of the metropolitan area. As a result, our data provide an index of changes in homeownership, not a true measure of homeownership change. This limitation notwithstanding, it is important to include variables that capture the migration of homeowners both into and out of the neighborhood. A neighborhood with almost no in- or out-migration (thus zero net migration) is unlikely to experience much change in property values. A neighborhood with substantial in- and out-migration, however (again zero net migration, but perhaps evidence of gentrification), is likely to experience significant changes in property values. Further, the effects of in- and out-migration could well be highly asymmetric. A high degree of out-migration that simply reflects the replacement of existing homeowners with new first-time homeowners could indicate a relatively meaningless life-cycle transition. A high degree of in-migration, however, in which homeowners from other parts of the metropolitan area replace renters, could be a powerful signal of gentrification.

Despite these limitations, the homeowner migration data reveal some interesting trends. As expected, the ZIP codes with the largest

[6] Because first-time homeowners and homeowners moving out to or in from other regions were not represented in the matrix, our measure of changes in homeownership could be systematically biased. For example, our measure might underestimate increases in homeownership rates in neighborhoods attracting first-time homeowners and homeowners from other metropolitan areas. Similarly, our data could perhaps underestimate decreases in homeownership rates in neighborhoods from which homeowners move out of the area or into rental units. We suspect that such systematic errors, if they exist, are small. But it is important to consider their potential influence in interpreting the results.

out-migration are located in the center of the metropolitan area, while those with the largest in-migration are located in the inner ring. Further, the flow of migration seldom seems to cross a line that runs southeast from the CBD. That is, when Cleveland homeowners migrate to or from the suburbs, they tend to stay on the same side of town. This may reflect submetropolitan regional preferences, employment accessibility, or differences in class and race. We plan to explore this question in subsequent work. Here, we use migration data to explore whether the influx or exodus of homeowners has significant effects on property values.[7]

Our data on establishment and employment change come from the Ohio Economic Development Database (derived from employment security ES-202 data), which contains detailed information on establishments and employment on a quarterly basis.[8] The data we use list the location of establishments (at the ZIP code level), employment, wage, and type of industrial activities (four-digit Standard Industrial Classification (SIC) code) from 1991 to 1995. Employment data are classified into the following sectors: manufacturing, retail, wholesale, personal service, producer service, and social service.[9]

Changes in establishments and employment are presented in figures 3 and 4. As shown, increases in the number of establishments are greatest in the far southeast ZIP codes, with strong establishment growth also in the southwest and CBD. These patterns are consistent with observations by Ding and Bingham (2000), who explore the growth of Cleveland's southeastern and southwestern edge cities. As employment shifted to the suburbs, edge cities began to emerge.[10] The Cleveland metropolitan area contains three edge cities: Hopkins Airport at I–71,

[7] More information about homeowner flows is available from the authors.

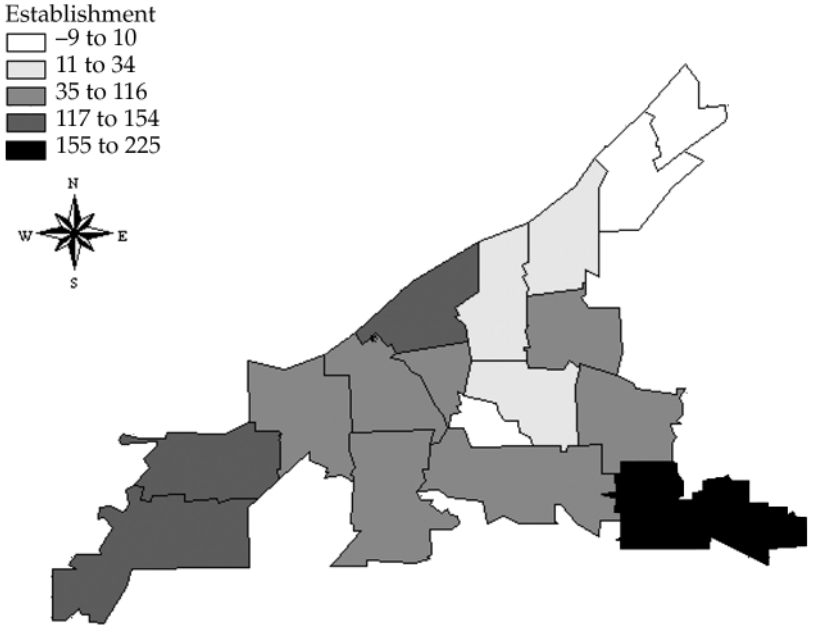
[8] It is well-known that there are flaws in ES-202 data, such as double counts, under- or overestimates of economic activities in a particular location (branch employment reported for the headquarters location, which may be in other regions or cities), etc. There is no way for us to determine the impact of data flaws, but we think that if errors are systematic, they will not bias the general results for this cross-section analysis.

[9] Manufacturing includes durable and nondurable goods; producer services include electric, gas, sanitary, and banking; social services include medical services, hospitals, education, welfare, nonprofit, postal service, government, and miscellaneous social services; and personal services include domestic services, hotels, eating and drinking, repair, laundry, barber and beauty shop, entertainment, etc.

[10] According to *Washington Post* writer Joel Garreau (1991), an edge city (1) has 5 million square feet of leaseable office space, (2) has 600,000 square feet of leasable retail space, (3) has more jobs than bedrooms, (4) is perceived by the population as one place, and (5) was nothing like a "city" as recently as 30 years ago.

Chagrin Boulevard at I–271, and Rockside Road at I–77 (Bingham and Zhang 1997). The Hopkins Airport area is a manufacturing-oriented edge city. Manufacturing accounts for 27 percent of employment in this ZIP code. By contrast, Rockside Road is classified as an information and producer services edge city, where Kaiser Permanente, AT&T, and NCR have office complexes. Chagrin Boulevard is viewed as a mixed-services edge city, although it shares many information and producer services attributes. It was developed mainly along the I–271 corridor. The dark-shaded areas in figures 3 and 4 include parts of, or are adjacent to, these edge cities.

Figure 3. **Growth in the Number of Business Establishments in the City of Cleveland by ZIP Code, 1991 to 1995**

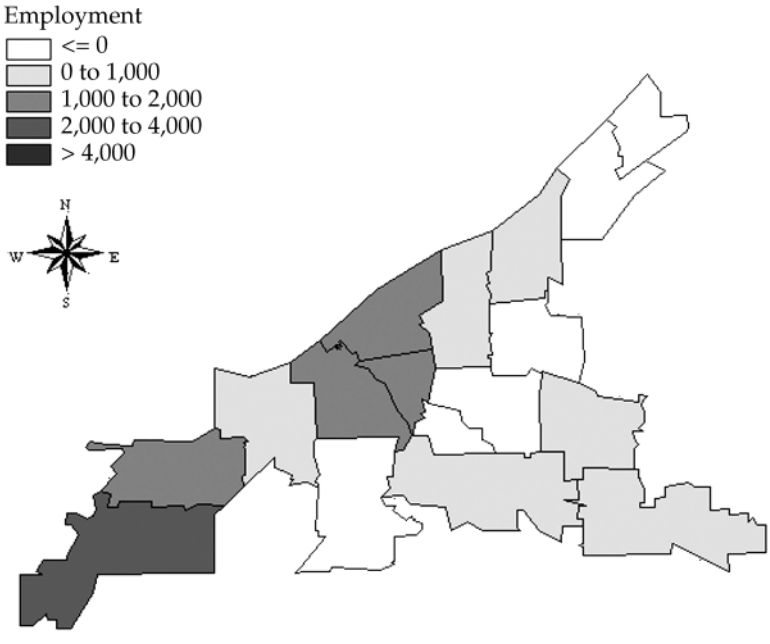


Additional measures of neighborhood characteristics were taken from a variety of sources or computed using GIS operations. From the 1990 census, we obtained data on population, racial composition, median household income, and poverty rates.[11] From Simons, Quercia, and Maric (1998), we obtained data on crime rates at the census-tract level.

[11] 2000 census data were not available at the time we conducted this analysis. Since our main focus is to investigate changes in the price of housing sold in 1996 and 1997, it is not clear that the 2000 data are to be preferred.

Finally, the Cuyahoga River divides the city of Cleveland into eastern and western regions. The eastern region, with a higher concentration of low-income and minority households, is perceived as less prestigious (Simons, Quercia, and Maric 1998). Using GIS operations, we created a dummy variable to capture this distinction. Table 1 presents descriptive statistics of neighborhood variables by ZIP code and census tract.

Figure 4. **Growth in Employment in the City of Cleveland by ZIP Code, 1991 to 1995**



Data on housing transactions included detailed information on housing structure, such as condition, style, age, price, transaction date, and many others (see the appendix). Sales observations are limited to single-family houses sold in 1996 and 1997. After cleaning (removing inconsistent and incomplete observations such as missing structural characteristics and non-arm-length transactions), integrating, and eliminating outliers from the data (sales with prices of less than $10,000 or more than $200,000 and missing variables), we had 6,960 sales observations. Table 2 presents descriptive statistics of all variables for individual sales observations.

These descriptive statistics characterize a housing stock typical of an old central city in the Midwest. The median single-family house sold for $57,000. This house is in average condition, is about 70 years old, and

Table 1. **Descriptive Statistics of Neighborhoods by ZIP Code and Census Tract**

Variable	Mean	Median	Maximum	Minimum	Standard Deviation
INV	933112.85	601825.00	8626511.00	0.00	2279579.72
HHOUT	211.36	166.00	632.00	1.00	200.09
HHIN	75.08	51.00	292.00	1.00	74.67
EMP_EST	92.32	87.00	272.00	–9.00	73.62
MANU_EST	0.12	0.00	20.00	–13.00	7.98
PERS_EST	17.84	16.00	49.00	–10.00	15.08
PROD_EST	8.36	7.00	43.00	–3.00	9.14
SOCI_EST	9.52	7.00	48.00	–15.00	12.62
RET_EST	23.68	26.00	99.00	–18.00	23.52
WHSL_EST	4.20	2.00	24.00	–8.00	7.63
OTHER_EST	28.60	18.00	132.00	–13.00	33.48
POV89R	28.22	29.00	100.00	0.00	19.61
INC90	14667.78	15022.00	34789.00	0.00	8509.36
AAP90	39.31	9.33	99.53	0.00	43.45
CR_TYP	32.69	29.11	230.36	0.00	27.38

Note: POV89R, INC90, AAP90, and CR_TYP are defined at the census-tract level. Otherwise, variables are defined at the ZIP code level.

has almost 3 bedrooms, 1 bath, and just over 1,200 square feet of living area. The typical garage holds 1.2 cars. Among houses in the sample, porches are common, but fireplaces are not. The dimensions of the average lot are 41' × 125'. Just over half of the houses sold in 1996, and 31 percent sold in the summer. The average distance to the CBD is slightly over 6 miles.

Because we obtained the data from a variety of sources in a variety of forms, a number of data transformations were necessary in order to conduct our analysis. Most of these involved the use of GIS operations. More specifically:

1. We used GIS operations to integrate data linked to various spatial units. For example, both the sales and housing investment data are linked to tax-lot parcels, demographic data are linked to census tracts, and employment data are linked to ZIP codes. GIS operations enabled us to assign census and ZIP code data to the sales of particular parcels.

2. We also used GIS operations to calculate spatial distance variables, such as the distance from the location of a sales observation to the CBD, and to determine whether the house sold was east or west of the Cuyahoga River. In addition, we used GIS operations to calculate the distance from a sale to the locations of new houses. To

Table 2. **Descriptive Statistics of Sales Observations**

Variable	Mean	Maximum	Minimum	Standard Deviation
PRICE	$57,124.27	$198,000	$10,100	$26,739.93
CON_G_VG	0.0460	1	0	0.2095
CON_AVG	0.6076	1	0	0.4883
CON_FAIR	0.2322	1	0	0.4223
CON_POOR	0.0905	1	0	0.2870
BSM_CRAWL	0.0458	1	0	0.2092
BSM_SLAB	0.0522	1	0	0.2224
BSMFINISH	0.0046	1	0	0.0677
BSM_PART	0.0915	1	0	0.2884
STYLE_BUN	0.4070	1	0	0.4913
STYLE_RAN	0.1323	1	0	0.3389
EXTWALL_1	0.0332	1	0	0.1792
EXTWALL_2	0.4643	1	0	0.4988
EXTWALL_3	0.1204	1	0	0.3255
FIREPLACE	0.1323	9	0	0.3728
GAR_CAPAC	1.2819	7	0	0.7503
HEAT	0.0375	1	0	0.1900
PORCH	0.7081	1	0	0.4546
BEDROOM	2.9325	8	0	0.7590
BATH	1.0503	4	0	0.2295
LIVING_AREA	1231.01	4080	0	318.4116
FRONT	41.41	500	8	12.0066
DEPTH	124.78	1372	11	38.7535
WINTER	0.15	1	0	0.3585
SPRING	0.27	1	0	0.4453
FALL	0.27	1	0	0.4447
SALE_97	0.48	1	0	0.4997
AGE	69.98	197	3	20.9299
POV89R	17.98	75	3	12.7026
INC90	$22,572.02	$34,789	$4,999	$5,946.9660
AAP90	23.45	154	0	37.3629
CR_TYP	24.74	172	8	10.5219
DISTCBD	6.16	10.818	0.454	1.7390
EW	0.37	1	0	0.4832
INV150	607.20	380000	0	8682.279
INV150-INV300	3201.96	1861750	0	32667.55
INV300-INV500	7485.29	1640000	0	56822.76
HHOUT	239.11	513	1	167.7008
HHIN	57.60	236	1	39.5707
EMP_EST	100.78	272	–9	58.6453
MANU_EST	–0.22	20	–13	4.3562
PERS_EST	18.43	49	–10	11.9907
PROD_EST	7.44	43	–3	5.1451
SOCI_EST	7.35	48	–15	6.0989
RET_EST	32.24	99	–18	22.6778
WHSL_EST	7.13	18	–8	6.8828
OTHERS_EST	28.41	132	–13	24.5624

explore this relationship in depth, we created three distinct variables: INV150, INV150-INV300, and INV300-INV500 capture the dollar value of new investments within 150, 150 to 300, and 300 to 500 feet from the location of a sale.

3. Finally, because we are interested in neighborhood change and our variables measure annual change, we can cumulate changes over time. We experimented with a variety of time-lag structures and found that five-year accumulations produced the best results. In the analyses that follow, investments in new housing, migration of homeowners, and changes in employment and business establishments are cumulated over a five-year period: We examine the effects on property values of any housing investment, migration of homeowners, or establishment of a new business that took place (within the specified geographic unit) in the five-year period before the date of sale.

Empirical results

To explore the relationship between neighborhood change and property values, we specify the following hedonic equation:

$$P_i = \beta_0 + \beta_1 X_i + \beta_2 \text{HHIN}_i + \beta_3 \text{HHOUT}_i + \beta_4 \text{INV150}_i + \beta_5 (\text{INV300} - \text{INV150})_i + \beta_6 (\text{INV500} - \text{INV300})_i + \beta_7 \text{EMP\_EST}_i + e_i \quad (1)$$

where P_i represents sales price per acre of property i; X is a vector of control variables such as structure, location, accessibility, or time; and HHIN_i and HHOUT_i capture cumulative changes in household in-migration and out-migration, respectively, in the neighborhood in which house i is located; INV150 reflects cumulative new housing investment within 150 feet (total dollars); INV300-INV150 reflects cumulative new housing investment within the zone of 150 to 300 feet (total dollars); INV500-INV300 reflects cumulative new housing investment within 500 to 300 feet (total dollars); EMP_EST reflects cumulative changes in the number of establishments; βs are coefficients; and e is the error term.[12] Our review of the literature suggests that new

[12] We tested alternative model specifications and found that the linear model fits the data well. For instance, we used the Box-Cox transformation technique to examine nonlinearity between prices and key independent variables such as size. We found that the gain from using nonlinear form is marginal and that the linear form is best. Furthermore, examination of the variance-covariance matrix revealed moderate multicolinearity among the independent variables, particularly among neighborhood variables such as POV89R, INC90, AAP90, and CR_TYPE. The correlation coefficient between

investments and in-migration will have a positive impact on housing prices, whereas employment growth and household out-migration will have a negative impact. Thus, we expect the sign of β_2 and β_4 to be positive and the sign of β_3 and β_7 to be negative. The sign of coefficients β_5 and β_6 will be positive if neighborhood investments have a large geographic impact. This will be tested in the model.

Table 3 presents empirical results. Overall, the data fit the model well and explain almost 60 percent of the variance in housing prices. Of the 22 structural variables, 14 have significant coefficients with expected signs. Houses in good or very good condition sold for $6,950 more than houses in average condition. Colonial-style houses sold for more than ranch and bungalow-style houses. Frontage length was valued more than depth. A one-foot increase in lot frontage raised property values by more than $160, almost five times as much as the $35 marginal value of lot depth. Houses with stone and/or brick walls cost, on average, $5,500 more than houses with frame walls. Houses with a fireplace, garage, and forced-air heat were priced higher than houses that did not have these features. Also, prices rise with the size of the house. An additional square foot of interior living space increases housing prices by almost $19. Despite the continued suburbanization of the population, housing prices increase over time. Compared with 1996, housing prices were almost $1,400 higher in 1997. However, prices fall by slightly over $270 as houses age. Seasonal variables indicate that prices fluctuate with the seasons. Although fewer houses sell in the winter, housing prices then are over $1,400 less than in the summer.

All demographic variables, except the poverty ratio, are significant at the $p = 0.10$ level with expected signs. Housing prices increase with household income and decrease with the size of the black population. Houses in high-crime neighborhoods have substantially lower prices. Although a location farther from the CBD can result in higher commuting costs, housing prices increase by over $800 per mile with distance from the CBD. Finally, as expected, houses in the west sell for more than houses in the east.

The impact on housing prices of variables that capture neighborhood effects were as expected. The coefficient on homeowner out-migration (HHOUT) reveals that prices of parcels fell with the number of homeowners who moved out of the encompassing ZIP code to other locations in the metropolitan area. The coefficient on homeowner in-migration (HHIN) reveals that property values rose with the

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income and African American is not as high as expected. Separate model specifications without POV89R and AAP90, respectively, were tested and yield similar results. This indicates that multicolinearity does not affect the estimates of coefficients and the generality of the conclusions.

Table 3. **Determinants of Property Values**

Variable	Coefficient	*t*-Statistic
Constant	27038.22***	6.883582
CON_G_VG	6947.457***	3.8406
CON_AVG	965.5198	0.63815
CON_FAIR	–4760.957***	–3.272887
CON_POOR	–5213.108***	–3.423452
BSM_CRAWL	–9244.11***	–8.500928
BSM_SLAB	–8095.163***	–7.986868
BSMFINISH	5027.533	1.640352
BSM_PART	5639.736***	7.404224
STYLE_BUN	–1989.527***	–4.01143
STYLE_RAN	–2477.462***	–2.918708
EXTWALL_1	–4698.993***	–3.935748
EXTWALL_2	–41.13348	–0.087704
EXTWALL_3	5616.295***	7.551014
FIREPLACE	5498.514***	9.349253
GAR_CAPAC	2313.678***	7.766086
HEAT	2223.006	1.940928
PORCH	453.718	0.848087
BEDROOM	–613.4639	–1.772454
BATH	771.0447	0.797384
LIVING_AREA	18.81011***	19.79321
FRONT	162.1816***	8.651529
DEPTH	35.44433***	6.282029
WINTER	–1418.094*	–2.16945
SPRING	–649.1332	–1.188115
FALL	–41.54759	–0.076042
SALE_97	1401.742***	3.363864
AGE	–270.8971***	–15.77626
POV89R	–29.73443	–0.593531
INC90	0.993917***	10.70556
AAP90	–81.75458***	–8.440705
CR_TYP	–302.7998***	–10.91492
DISTCBD	828.9879***	3.74948
EW	–4359.811***	–6.120835
HHOUT	–5.254909***	–3.015746
HHIN	9.320861	1.229155
EMP_EST	–22.39285***	–5.247563
INV150	0.083562***	2.872493
INV300-INV150	0.019542*	2.14367
INV500-INV300	0.007771	1.653744
R^2	0.588713	
Adjusted R^2	0.586395	

*$p = 0.10$. **$p = 0.05$. ***$p = 0.01$.

number of homeowners who moved into the encompassing ZIP code from other parts of the metropolitan area, although the effect is insignificant.[13] These results must be interpreted cautiously, because our migration data do not include new homeowners, homeowners who moved into or out of the metropolitan area, or renters. It appears, however, that the movement of homeowners has a significant impact on property values.

The effects of new investments on housing values were unambiguous. The coefficient on new housing investments reveals that property values were higher in ZIP codes in which there were more investments in new housing. This suggests that urban infill, through investments in new subsidized housing, can have a significantly positive impact on housing values. As shown by the coefficients on the variables INV150, INV150-INV300, and INV300-INV500, the effects of new housing investments diminished with distance between the new investment and the site of the sale.[14] This result is consistent with the findings of Ding, Simons, and Baku (2000).

The effect of new business establishments also is unambiguous. As shown by the coefficient on total establishments (EMP_EST), growth in the number of establishments in the ZIP code reduces housing values. To explore this effect in more detail, we disaggregated growth in establishments into the major SIC categories: manufacturing, personal services, producer services, social services, retail, and wholesale. Table 4 presents the results. As shown by the coefficients for the respective categories, the results were mixed but explainable. The coefficients for manufacturing, personal services, producer services, retail, and wholesale are all negative, though significant only for retail and producer services. This implies that new establishments in these sectors reduce property values. However, the coefficient for social service establishments such as hospitals, legal clinics, and schools is positive and significant, which suggests that new establishments in this sector increase property values.[15]

[13] The effect is insignificant in part because of the relatively high positive correlation between in-migration and out-migration; the pairwise correlation coefficient equals 0.81. In alternative specifications, with fewer variables, the in-migration coefficient is positive and significant.

[14] This result is consistent with Ding, Simons, and Baku (2000), even though the coefficients of new investment variables appear to be larger than the ones found in Simons, Quercia, and Maric (1998). Previous analysis using the same data set or a similar one reveals that the coefficients of new investment variables become larger if the scope of this spatially lagged variable becomes smaller.

[15] Similar analyses with employment data produced similar results.

Table 4. **Determinants of Property Values with Establishment Growth Disaggregated by SIC**

Variable	Coefficient	*t*-Statistic
Constant	26123***	6.618137
CON_G_VG	7431.963***	4.100508
CON_AVG	1420.332	0.93635
CON_FAIR	–4087.883**	–2.800591
CON_POOR	–4929.51***	–3.239412
BSM_CRAWL	–9478.195***	–8.713317
BSM_SLAB	–8228.983***	–8.12084
BSMFINISH	5192.547	1.696795
BSM_PART	5639.984***	7.411247
STYLE_BUN	–1867.476***	–3.759649
STYLE_RAN	–2489.073***	–2.933532
EXTWALL_1	–4703.179***	–3.943685
EXTWALL_2	–39.9175	–0.08519
EXTWALL_3	5470.744***	7.359164
FIREPLACE	5336.141***	9.060723
GAR_CAPAC	2399.534***	8.050797
HEAT	2186.253	1.91138
PORCH	384.8174	0.718959
BEDROOM	–639.1377	–1.849085
BATH	727.1479	0.753078
LIVING_AREA	18.61653***	19.59539
FRONT	164.3493***	8.775329
DEPTH	35.93848***	6.372554
WINTER	–1441.954*	–2.209135
SPRING	–672.9387	–1.233109
FALL	–29.92101	–0.054851
SALE_97	1422.7***	3.418132
AGE	–265.9668***	–15.47466
POV89R	–40.81887	–0.812959
INC90	0.995625***	10.49808
AAP90	–83.70255***	–8.399439
CR_TYP	–306.8198***	–11.00297
DISTCBD	1065.96***	4.465715
EW	–4673.703***	–6.235518
INV150	0.084275***	2.901201
INV300-INV150	0.019531*	2.145651
INV500-INV300	0.007272	1.548558
HHOUT	–6.853228*	–2.173558
HHIN	15.09949	1.205093
MANU_EST	–113.2374	–1.910433
PERS_EST	–23.97554	–0.610026
PROD_EST	–375.1184***	–3.949778
SOCI_EST	215.1506***	3.706869
RET_EST	–53.07657***	–3.231869
WHSL_EST	–66.42474	–0.946895
OTHER_EST	29.26289	1.603304
R^2	0.590457	
Adjusted R^2	5.88E-01	

*p = 0.10. **p = 0.05. ***p = 0.01.

Conclusion

We sought to explore the influence of neighborhood revitalization strategies on residential property values, where neighborhoods are defined by ZIP codes and neighborhood revitalization strategies include policies that encourage homeownership, investments in new housing, and economic development. The results varied as expected. Investments in new housing had significantly positive effects on values, especially for properties located near the investment. Out-migration of homeowners had a negative effect, and in-migration had a positive, although not a significant, effect. Increases in producer services and retail establishments, meanwhile, had a negative effect, while growth in social service establishments had a positive one.

Although these results are robust, all conclusions must be cautiously drawn because ZIP codes are not small, homogenous, or defined by economic or social functions. Further, the econometric specification presumes that our three measures of neighborhood change are independent. This is likely not the case. Though the bivariate correlations between migration, housing investments, and establishment growth are low (they range from 0.06 to 0.4), new investments in housing construction are likely to encourage homeowner in-migration and new retail activity. Other sequences of multiple effects are also plausible. Longer time series data and more complex estimation techniques are needed to identify causation paths.

Nevertheless, the results provide strong, compelling evidence that property values are enhanced by investments in subsidized housing. These results lend empirical support for housing-focused community development strategies adopted by many CDCs and promoted by the city. Moreover, the positive impact of investments in new housing increases significantly with proximity to the new construction. Thus, at varying spatial scales, the neighborhood revitalization hypothesis is strongly confirmed.

The results also imply that property values can be harmed by the out-migration of existing homeowners and, most likely, increased by the in-migration of homeowners. This suggests that policies designed to increase and maintain homeownership in a neighborhood may also increase neighborhood quality. These results thus confirm the findings of Rohe and Stewart (1996), who noted similarly positive correlations between homeownership rates and property values at the census-tract level. The direction of causation implied by our results, however, is unclear. That is, because we focus on homeowner migration, it is equally likely that homeowners are attracted to neighborhoods where property values are rising and leave those where property values are

falling. In addition, because our data exclude first-time home buyers and homeowner migration from other metropolitan areas, our results require careful interpretation. Housing prices are clearly lower in neighborhoods that homeowners are leaving and perhaps higher in neighborhoods that are attracting homeowners from other parts of the metropolitan area. But because our data do not capture changes in homeownership caused by first-time home buying or migration between metropolitan areas, it is not clear whether we are capturing the true effects of changes in homeownership or reputational effects reflected in intraregional homeownership migration. Further insights might be gained by exploring the determinants of homeowner migration. We leave this for future research.

Finally, the results suggest that growth in the number of business establishments (excluding social services) can decrease property values. Taken at face value, this suggests that some NIMBY ("not in my backyard") behavior by property owners faced with economic development is indeed rational. At the ZIP code level, growth in the number of establishments of various kinds has detrimental effects on housing prices. Though at first this result appears counterintuitive, the unit of analysis offers a plausible explanation. It is well-known that proximity to commercial and industrial land uses has both positive and negative effects on residential property values (Li and Brown 1980). Proximity to employment provides positive effects, while proximity to traffic, noise, and nonconforming land uses can have negative effects. Further, according to threshold theories of neighborhood change (Quercia and Galster 2000), cumulative negative effects can reach a threshold where neighborhood quality falls in a downward spiral. This is what property owners fear. Our results suggest that this phenomenon can operate at a scale as large as a ZIP code.

But these results do not necessarily imply that residential and nonresidential land uses should never be mixed. Many negative externalities can be minimized by using strategies such as buffer strips, green infrastructure, careful separation of pedestrians and cars, and other design features (Ewing and Hodder n.d.). The results do suggest, however, that the proliferation of commercial and industrial activity in a neighborhood without adequate attention to urban design can result in lower property values and, perhaps, neighborhood instability. Finally, the results provide strong empirical support for the kinds of efforts in which CDCs are often engaged: housing development, homeownership finance, and the provision of social services.

Appendix

Table A.1. **Definitions of Variables**

Variable	Definition
PRICE	Prices of properties sold in 1996 and 1997
CON_G_VG	Dummy—good and very good condition
CON_AVG	Dummy—average condition
CON_FAIR	Dummy—fair condition
CON_POOR	Dummy—poor condition
BSM_CRAWL	Dummy—basement type, crawl
BSM_SLAB	Dummy—basement type, slab
BSMFINISH	Dummy—basement finished
BSM_PART	Dummy—basement partially finished
STYLE_BUN	Dummy—bungalow style
STYLE_RAN	Dummy—ranch style
EXTWALL_1	Dummy—exterior walls of abestos shingles
EXTWALL_2	Dummy—exterior walls of aluminum/vinyl siding
EXTWALL_3	Dummy—exterior walls of brick/stucco, brick, and stone
FIREPLACE	Dummy—fireplace
GARAGE	Garage capacity
HEAT	Dummy—not forced air heat
PORCH	Dummy—porch
BEDROOM	Number of bedrooms
BATH	Number of bathrooms (a half-bath is counted as 0.5 full bath)
LIVING_AREA	Square feet of interior space
FRONT	Lot frontage in feet
DEPTH	Lot depth in feet
WINTER	Dummy—sold in the winter
SPRING	Dummy—sold in the spring
FALL	Dummy—sold in the fall
SALE_97	Dummy—sold in 1997
AGE	Age of the building at the time it was sold
POV89R	Poverty percentage in the tract, 1989
INC90	Median household income in the tract, 1990
AAP90	Percentage of African Americans in the tract, 1990
CR_TYP	Type 1 crime index in the tract
DISTCBD	Distance to the CBD of Cleveland
EW	Dummy—side of the Cleveland metropolitan area, 1 for the east
INV150	New construction ($) within 150 feet from 1991 to 1995
INV300	New construction ($) within 300 feet 1991 to 1995
INV500	New construction ($) within 500 feet 1991 to 1995
HHOUT	Total households moving out from 1991 to 1995
HHIN	Total households moving in from 1991 to 1995
EMP_EST	Growth of industrial establishments from 1991 to 1995
MANU_EST	Growth of manufacturing establishments from 1991 to 1995
PERS_EST	Growth of personal service establishments from 1991 to 1995
PROD_EST	Growth of producer service establishments from 1991 to 1995
SOCI_EST	Growth of social service establishments from 1991 to 1995
RET_EST	Growth of retail establishments from 1991 to 1995
WHSL_EST	Growth of wholesale establishments from 1991 to 1995
OTHER_EST	Growth of all other establishments from 1991 to 1995

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